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Amendment and Response

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Applicant(s): Yates et al.

Serial No.: 10/770,797

Confirmation No.: 1476

Filed: February 3, 2004

For: COMPOSITIONS AND METHODS FOR REMOVING ETCH RESIDUE**Remarks**

The Office Action mailed June 23, 2006 has been received and reviewed. Claims 27, 38, 42, and 47 having been amended, and claim 26 having been canceled herein without prejudice, the pending claims are claims 27-50.

Claims 27, 42, and 47 have been amended to recite that "the composition is a cleaning composition," which is supported by the specification at, for example, page 6, lines 8-9. Claim 38 has been amended to recite that "the composition is a cleaning composition effective to remove etch residue," which is supported by the specification at, for example, page 7, lines 26-29. Claim 27 has also been amended to recite that the composition is free of water, which is supported, for example, by claim 38 as filed.

Reconsideration and withdrawal of the rejections are respectfully requested.

Rejections under 35 U.S.C. §102

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2003/0148910 A1 (Peters et al.). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

Independent claims 27 (as amended) and 38 each recite that the composition is free of water. Independent claims 42 and 47 recite, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Peters et al. disclose "*aqueous*, acidic compositions" (abstract; emphasis added), i.e., compositions that contain water. Because the compositions disclosed by Peters et al. contain water, Applicants respectfully submit that independent claims 27 (as amended), 38, 42, and 47 are not anticipated by Peters et al.

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For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Peters et al.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Application Publication No. 2002/0043644 A1 (Wojtczak et al. '644) or U.S. Patent No. 6,280,651 (Wojtczak et al. '651). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

Independent claims 27, 38, 42, and 47 (as amended) each recite that the composition is a *cleaning* composition that includes, among other things, at least one fluoride ion source. As discussed in the specification, "[t]he fluoride ion source is present in an amount that provides effective removal of at least a portion of the etch residue, and preferably, substantially all the etch residue, with little or no attack on the desirable materials, such as aluminum, for example" (page 7, lines 26-29).

In contrast, Wojtczak et al. '644 and Wojtczak et al. '651 relate to "*etchant* formulations for the *etching* of various types of silicon oxide" (page 1, paragraph 0001 of Wojtczak et al. '644; and column 1, lines 6-7 of Wojtczak et al. '651; emphasis added). Because the formulations disclosed by Wojtczak et al. '644 and Wojtczak et al. '651 are etchant formulations, Applicants respectfully submit that independent claims 27, 38, 42, and 47 (as amended) are not anticipated by Wojtczak et al. '644 or Wojtczak et al. '651.

Further, with respect to independent claims 42 and 47, each recites, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Wojtczak et al. '644 and Wojtczak et al. '651 disclose that "[t]he formulations have the general composition of a *chelating agent*" (abstract; emphasis added). Because the compositions disclosed by Wojtczak et al. '644 and Wojtczak et al. '651 include, among other

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things, a chelating agent, Applicants respectfully submit that independent claims 42 and 47 are not anticipated by Wojtczak et al. '644 and Wojtczak et al. '651.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Wojtczak et al. '644 or Wojtczak et al. '651.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,755,989 (Wojtczak et al. '989). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

Independent claims 27 (as amended) and 38 each recite that the composition is free of water. Independent claims 42 and 47 recite, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Wojtczak et al. '989 disclose "[a] semiconductor wafer cleaning formulation, including . . . 23-50% wt. *water*" (abstract; emphasis added). Because the formulation disclosed by Wojtczak et al. '989 contains water, Applicants respectfully submit that independent claims 27 (as amended), 38, 42, and 47 are not anticipated by Wojtczak et al. '989.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Wojtczak et al. '989.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent Nos. 6,666,986 (Vaartstra '986) or 6,149,828 (Vaartstra '828). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

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Independent claims 27, 38, 42, and 47 (as amended) each recite that the composition is a *cleaning* composition that includes, among other things, at least one fluoride ion source. As discussed in the specification, "[t]he fluoride ion source is present in an amount that provides effective removal of at least a portion of the etch residue, and preferably, substantially all the etch residue, with little or no attack on the desirable materials, such as aluminum, for example" (page 7, lines 26-29).

In contrast, Vaartstra '986 and Vaartstra '828 relate to "supercritical *etching* compositions and methods for using supercritical etching compositions to *etch* inorganic material of semiconductor-based substrates" (column 1, lines 9-12 of Vaartstra '986; column 1, lines 7-10 of Vaartstra '828; emphasis added). Because the compositions disclosed by Vaartstra '986 and Vaartstra '828 are etching compositions, Applicants respectfully submit that independent claims 27, 38, 42, and 47 (as amended) are not anticipated by Vaartstra '986 or Vaartstra '828.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Vaartstra '986 or Vaartstra '828.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,462,005 (Gotoh et al.). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

Independent claims 27 (as amended) and 38 each recite that the composition is free of water. Independent claims 42 and 47 recite, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Gotoh et al. disclose "[a] cleaning agent for use in the manufacture of a semiconductor device comprising an *aqueous* solution" (abstract; emphasis added), i.e., a solution that contains water. Because the solution disclosed by Gotoh et al. contains water,

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Applicants respectfully submit that independent claims 27 (as amended), 38, 42, and 47 are not anticipated by Gotoh et al.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Gotoh et al.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 6,030,932 (Leon et al.). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

Independent claims 27 (as amended) and 38 each recite that the composition is free of water. Independent claims 42 and 47 recite, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Leon et al. disclose "cleaning compositions that are *aqueous* based" (abstract; emphasis added), i.e., compositions that contain water. Because the compositions disclosed by Leon et al. contain water, Applicants respectfully submit that independent claims 27 (as amended), 38, 42, and 47 are not anticipated by Leon et al.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Leon et al.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,990,060 (Ohmi et al.). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

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Independent claims 27 (as amended) and 38 each recite that the composition is free of water. Independent claims 42 and 47 recite, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Ohmi et al. disclose "a cleaning liquid prepared by mixing a basic and water-soluble fluoride and an oxidizing agent in pure *water*" (abstract; emphasis added). Because the compositions disclosed by Ohmi et al. contain water, Applicants respectfully submit that independent claims 27 (as amended), 38, 42, and 47 are not anticipated by Ohmi et al.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Ohmi et al.

The Examiner rejected claims 26-50 under 35 U.S.C. §102(e) as being anticipated by U.S. Patent No. 5,962,385 (Muruyama et al.). Claim 26 having been canceled, the rejection as applied to claim 26 has been rendered moot. Applicants respectfully traverse the rejection as applied to claims 27-50.

Independent claims 27 (as amended) and 38 each recite that the composition is free of water. Independent claims 42 and 47 recite, respectively, that the composition consists essentially of, or consists of: at least one fluoride ion source comprising an organic cation; and at least one organic solvent.

In contrast, Muruyama et al. disclose "[a] cleaning liquid for semiconductor devices comprising . . . , and the remaining amount being *water*" (abstract; emphasis added). Because the compositions disclosed by Muruyama et al. contain water, Applicants respectfully submit that independent claims 27 (as amended), 38, 42, and 47 are not anticipated by Muruyama et al.

For at least these reasons, Applicants respectfully request that the Examiner reconsider and withdraw the rejection of claims 26-50 under 35 U.S.C. §102 as being anticipated by Muruyama et al.

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For: COMPOSITIONS AND METHODS FOR REMOVING ETCH RESIDUE**Summary**

It is respectfully submitted that all the pending claims are in condition for allowance and notification to that effect is respectfully requested. The Examiner is invited to contact Applicants' Representatives, at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted

By

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CERTIFICATE UNDER 37 CFR §1.8:

The undersigned hereby certifies that the Transmittal Letter and the paper(s), as described hereinabove, are being transmitted by facsimile in accordance with 37 CFR §1.6(d) to the Patent and Trademark Office, addressed to Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on this 22nd day of September, 2006, at 3:05 pm (Central Time).

By: Name: Dani Moroz